SOME QUEENSLAND FOSSIL VERTEBRATES.

By Heber A. Longman, F.L.S., Director, Queensland Museum.

(Plates I.-IV.)

Introduction.—This paper contains descriptions of a new genus of Cretaceous marine reptiles from Hughenden, and a new species of crocodile from alluvial deposits at Tara Creek. A new generic name is proposed for *Triclis* De Vis (preoccupied). The status of several species of Queensland fossil vertebrates is discussed in the light of new or revised material, and a record is made of a series of remains from the Marmor Quarry.

DIPROTODON AUSTRALIS Owen.

Four specific names have been given to remains of *Diprotodon* from Australia. Owen's *D. australis* was first described in 1838.[1] *Diprotodon minor* was differentiated by Huxley in 1862[2], and in 1888 De Vis[3] further particularised this species. *Diprotodon longiceps* was described by McCoy in 1876, from the "Pliocene Clays of Colac," his cranial material showing, when compared with *D. australis*, a more slender or comparatively elongate head, and with longer and straighter lower incisors.[4] In 1877 Owen gave the name "*Diprotodon bennettii*" to an incomplete right mandibular ramus from Mandoona, N.S. Wales, as "an established variety or species of *Diprotodon*" (p. 510) which was also of a more slender type than *D. australis*.[5] This specimen, *No. 46056*, was subsequently included by Lydekker in *D. australis*.[6] Stirling and Zietz,[7] in their review of the Callabonna material, point out that there are numerous remains that give evidence of "a relatively small-sized Diprotodon," the differences between it and the larger forms being "mainly one of size." Although these authors consider the difference of bulk to be too great to be probably due to sexual characters, they do not altogether dismiss this possibility.

The largest cranium of *D. australis* in the Queensland Museum is 3 ft. 1½ in. in maximum length, but judging from the proportions of certain fragments in our collections it seems probable that some specimens of *Diprotodon* had skulls at least 3 ft. 6 in. long. The breadth of an anterior upper incisor may be as great as 60 mm. The lower incisors may exceed a foot in length;

[1] Owen, R., in Mitchell's "Three Expeditions into Eastern Australia, 1838, Vol. II., p. 362.

[2] Huxley, T. H., Quart. Journ. Geol. Soc., XVIII., 1862, pp. 422-427.

[3] De Vis, C. W., Proc. Roy. Soc. Qld., V., 1888, pp. 38-44.

[4] McCoy, F., Prod. Pal. Victoria, Dec. IV., 1876.

[5] Owen, R., Extinct Mammals Austr., 1877, p. 510.

[6] Lydekker, R., Catal. Foss. Mamm. Brit. Mus., V., 1877, p. 176.

[7] Stirling & Zietz, Mem. Roy. Soc. South Aus., I., 1899.

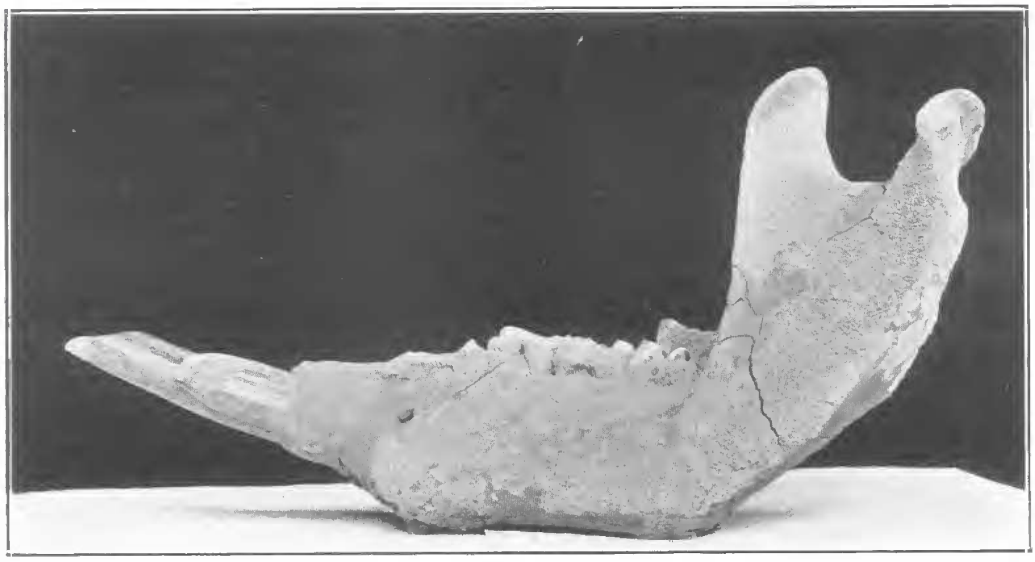


Fig. 1.—Mandible of *Diprotodon australis* Owen, with broken incisor. Maximum length 702 mm.

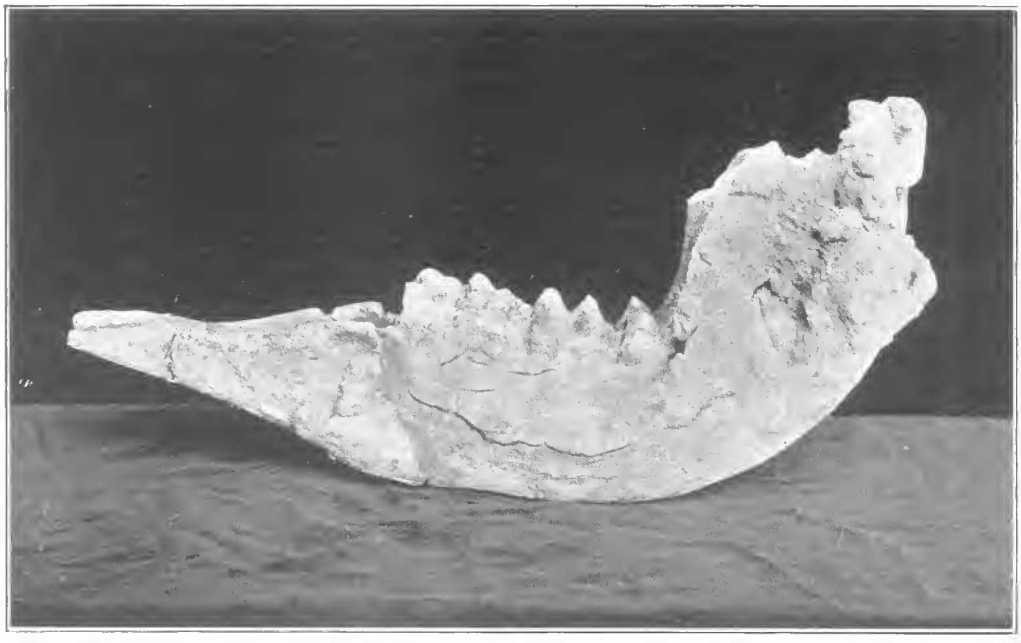


Fig. 2.—Mandible of *Diprotodon minor* Huxley. Maximum length 535 mm.

Photos., W. J. Sanderson.

Face page 17.

McCoy mentioned 13½ in. for his *D. longiceps*. These incisors, however, are most variable. In a juvenile specimen the length of the protruding part may be about equal to the antero-posterior diameter of a single molar, but in aged specimens it may more than exceed that of three molars. Probably the variation in mature specimens is partly attributable to sex characteristics, but it seems almost certain that there were two distinct species.

In October, 1922, Mr. Thomas Jack, of Dalby, forwarded to the Queensland Museum a number of remains, including fairly complete associated specimens of a right tibia, fibula, astragalus, calcaneum, and other pedal bones, together with the distal end of a femur of *Diprotodon australis*, which had been found in Jimbour Creek, Darling Downs. These fossils are remarkable for their unusual size. The maximum width, taken between vertical parallels, of the condyles of the femur is no less than 236 mm. The width of a complete femur on exhibition is 196 mm. in this region, and this bone is 745 mm. in maximum length. Although the proportions of the massive structure of the articular region are not likely to be fully represented in total length ratios, it is obvious that Mr. Jack's specimens demonstrate a very large Diprotodon.

A fairly complete mandible of *Diprotodon australis*, sent in by the late Mr. N. Pearson, from Nobby, Darling Downs, in April, 1913, is of interest because one of its incisors bears undoubted evidence of a complete fracture during life which doomed the animal to complete the remainder of its existence with a shortened tusk. As may be seen from Plate I., fig. 1, about one-third of the left incisor is missing. That this incident took place some time before death is obvious, for the fractured part has become relatively smooth on its exposed surfaces, though signs of the trouble are still noticeable in its irregular outlines. A splinter is also missing from the lateral surface near to the apex of the right incisor, and this area has been smoothed over. Whether the individual was a bellicose male who suffered as the result of conflict with his fellows, or perchance even because of domestic troubles, it is difficult to surmise, and the accident may have been the result of a clumsy fall. In view of the evidence recorded by Sterling and Zietz that Diprotodons fed on low shrubs (Salsolaceæ, Amarantaceæ, etc.), as deduced by palæobotanists from associated remains, it seems unlikely that the giant marsupial sustained an accident when attempting to reach arboreal food, and its pedal structure almost precludes this possibility. But whatever the cause, this fractured tusk demonstrates that peace was not the invariable portion of these huge herbivores in bygone days.

DIPROTODON MINOR Huxley.

Among the numerous fragments attributed to *Diprotodon* in the Queensland Museum there are several specimens tentatively classed as *D. minor*. The most interesting of these is a fairly complete though much-crushed cranium, with mandible and a number of associated bones, received from the Darling Downs in 1909, the donor being Mr. Charles Campbell, Surveyor. The cranium has

been obliquely compressed, yet the process must have taken place very gradually, for even the slender zygomata are not badly fractured. The molar series with the premolar is complete on each side. Although the wear manifested by the molars does not suggest the maximum of growth, the maturity of the individual is demonstrated by the fact that the hind lobes of both fourth molars have complete loops of dentine exposed, these being 5·5 mm. in antero-posterior diameter.

As it seems desirable to put on record data bearing on the question of a second species, the following dimensions are given :—

Maximum length of cranium from condyles to anterior edge of incisors	670
Diastema	119
Width of anterior incisor at emergence from alveolus	42
Antero-posterior diameter of molar series with p.m.^{4} right	207
Antero-posterior diameter of molar series with p.m.^{4} left	202
Width of m^1, anterior lobe	32
Width of m^2, anterior lobe	41
Width of m^3, anterior lobe	48
Width of m^4, anterior lobe	48
Width of m^4, posterior lobe	38·5

Owing to inequalities of wear in the premolars, satisfactory comparisons cannot be made between the features of these teeth in *D. australis* and *minor* as set out by Huxley and supplemented by De Vis. The measurements of the true molars are, on the whole, larger than those given for *D. minor* by Huxley. The lower jaw has a maximum length between verticals of 535 mm. The incisors are relatively small and do not protrude from their alveoli more than 90 mm. on the superior surface. No premolars are present.

In this specimen the distinctive features of *D. minor* as mentioned by De Vis (1888, p. 42) are present in the region of the mandibular symphysis. It must be added, however, that in some of our fragments the dimensions of the molar teeth in small mandibles are equal to those in very bulky jaws. Elongate and presumably male incisors are occasionally to be found in slender jaws of the *minor* type.

Although the evidence is not quite conclusive, a distinction between the two forms may be conveniently set out as follows :—

Mandibular symphysis broad at base of incisive sockets ; antero-inferior border terminating in an abrupt upward curve .. .. *Diprotodon australis.*

Mandibular symphysis relatively narrow at base of incisive sockets ; antero-inferior border sloping gradually to the plane of the incisors .. .. *Diprotodon minor.*

Four specimens illustrating these differences are shown on Plates I. and II.

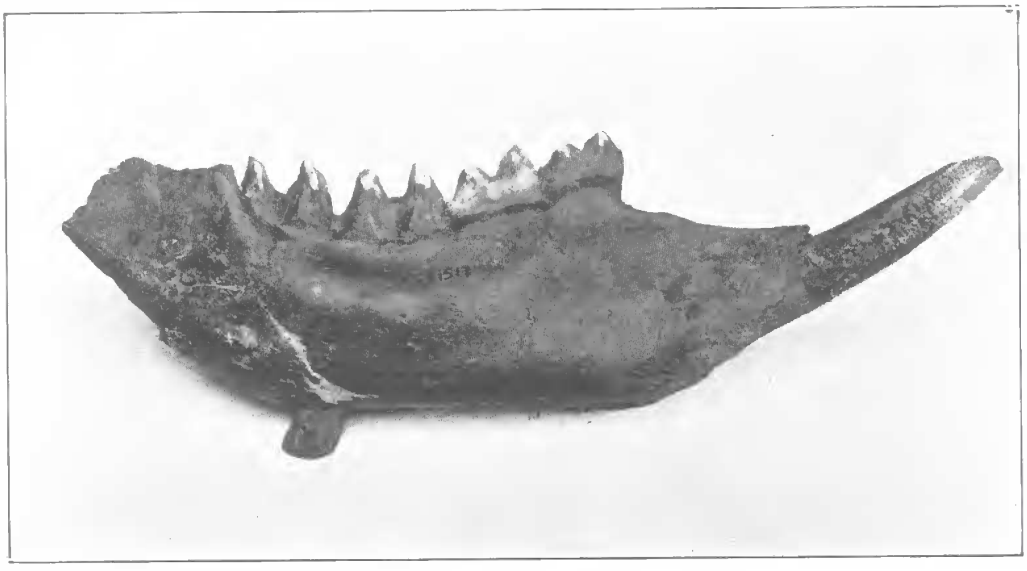


Fig. 1.—Incomplete mandible of *Diprotodon minor* Huxley. Maximum length 384 mm.

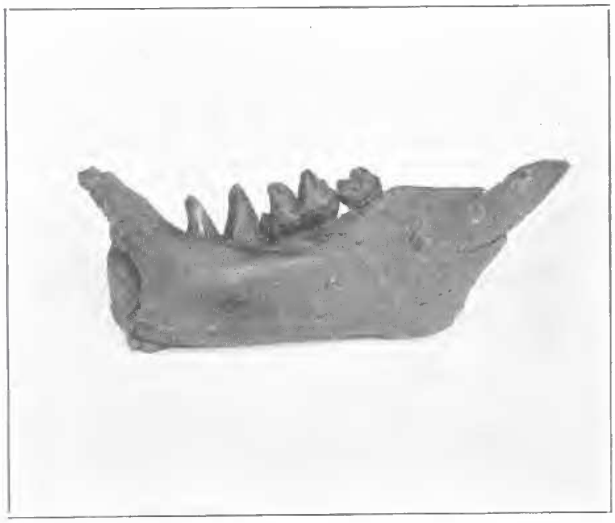
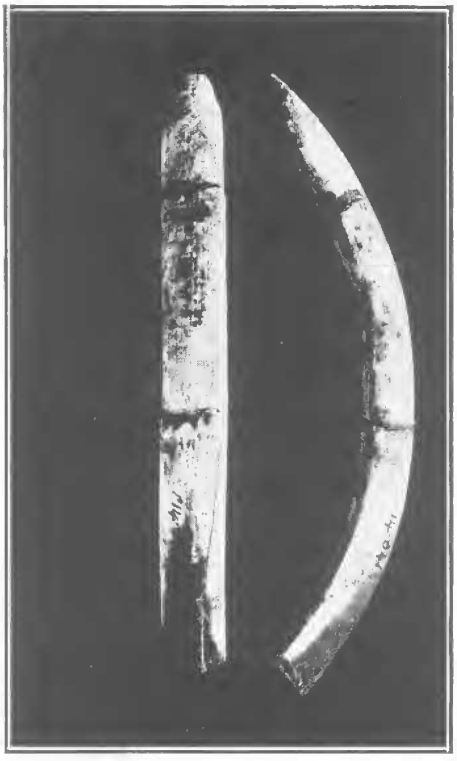


Fig. 2.—Incomplete mandible of juvenile *Diprotodon australis* Owen. Maximum length 212 mm.



Figs. 3 and 4.—Incisor of *Phascolomys magnus*.

Face page 19.

In passing, it may be noted that a present-day parallel for the existence of two associated species, mainly differing in size, is afforded by *Macropus giganteus* and *M. melanops*, the specific distinction of the latter having been recently affirmed by A. S. Le Souef.[8]

EURYZYGOMA DUNENSE (De Vis).[9]

In October last Mr. Thomas Jack donated an exceptionally well-preserved fragment of the above species, which had been secured in a well at Ehlma Siding, near Brigalow, at a depth of sixty-five feet. The specimen consists of a portion of the right maxilla with the first three true molars. Part of the zygomatic process is present, and the peculiar structure of this region (associated with the enormous development of the infero-lateral processes as described by the writer in 1921)[10] at once shows the relationship of the fossil with this very distinct form.

PHASCOLONUS GIGAS Owen.

In 1913 the late Sir Edward Sterling was able to demonstrate beyond doubt the association of the remarkable curved scalpriform teeth, previously known as *Sceparnodon ramsayi* Owen, with the molars of *Phascolonus*, and the distinction of this genus from the ordinary wombats.[11] This was made possible by the fine associated material found at Lake Callabonna and Normanville. As some controversy had arisen over the status of the incisor teeth, previously in doubt, and as De Vis had advanced other views and figured three kinds of teeth, it is advisable to review the specimens in the light of our fuller knowledge.

In passing, it may be said that the astonishing variety manifested in the dentition of our fossil marsupials is sufficient explanation, if such be needed, for the views advanced by De Vis when dealing with isolated teeth or very inadequate material. In the opinion of the writer the tooth figured by De Vis (1891, Plate XXII.) as a right lower incisor is a left upper incisor.[12] This is evidently a tooth from an immature individual, and it may be compared with that figured by Sterling (1913) in Plate XLV., fig. 6. The minimum width of this tooth is 16 mm. and the maximum at the incomplete radical end is 21. Apparently the young teeth are tapering, but the adult incisors may be parallel-sided and as much as 40 mm. in width. W. S. Dun's study of these teeth in 1894 affords other instances of variation.[13]

In 1893 De Vis published[14] a description of a maxillary fragment and also figured (Plate I.) a large incisor purported to be a right upper incisor of

[8] Le Souef, A. S., Austr. Zool., III., 1923, pp. 145-147.

[9] De Vis., C. W., Proc. Linn. Soc. N.S.W., II. (2), 1887, pp. 1065-1070.

[10] Longman, H. A., Mem. Qld. Mus., VII., pt. 2, 1921, pp. 65-80.

[11] Sterling, E. C., Mem. Roy. Soc. S. Aus., I., 1913, pp. 111-178.

[12] De Vis, C. W., Proc. Linn. Soc. N.S.W., (2) VI., 1891, pp. 258-262.

[13] Dun, W. S., Rec. Geol. Surv. N.S.W., III., 1892, pp. 25-28.

[14] De Vis, C. W., Proc. Linn. Soc. N.S.W., VIII. (2), 1893, pp. 11 12.

Phascolonus gigas. It is somewhat surprising to find that this isolated tooth agrees in detail with left lower incisors of *Euryzygoma* (*Nototherium*) *dunense*, of which there are now mature examples *in situ* in mandibles probably not available to De Vis in 1893. In sculpturing and dimensions these incisors agree admirably.

PHASCOLOMYS MAGNUS Owen.

(Plate II., figs. 3 and 4.)

A left upper sub-circular incisor of the *Phascolomys curvirostris* type from Gowrie Creek, Darling Downs, has been identified with *Phascolomys magnus*, with some little hesitation, as no anterior teeth have been previously associated with this species. Its dimensions are larger than those of a cast of the type of *P. curvirostris*, and the curve is greater. Following the upper surface of the arc, this tooth, which is almost perfect, is 176 mm. in length. The maximum breadth is 17 mm.; the antero-posterior diameter is 12·5 and the working surface is 26 mm. in extent. The dimensions are fairly regular throughout, and the tooth is but slightly smaller towards the apex. The inner side of this incisor is not flattened, but uniformly convex. The superior and lateral surfaces are clothed with slightly rugose enamel, and throughout the entire length there are fine but distinct parallel flutings. On the outer part of the ventral surface there is a shallow channel, but, with this exception, a section of the tooth shows even curves. A prominent pulp cavity is seen at the radical end, although this is infilled with fine debris.

In response to my inquiry, Dr. C. Anderson, Director of the Australian Museum, informs me that the type specimen of *Phascolomys curvirostris* is not in their collection, notwithstanding Lydekker's remarks,[15] so further comparison cannot be instituted. The writer suggests, however, that incisors of the *curvirostris* type will some day be found in association with molars of *Phascolomys medius*, and the anterior and posterior dental elements of these large wombats will then be fully elucidated.

PROPLEOPUS, new generic name.

PROPLEOPUS OSCILLANS (De Vis), 1888.[16]

Owing to the preoccupation of *Triclis* De Vis (1888) by *Triclis* Loew. (1851), the interesting mandible described by the Queensland palæontologist as *T. oscillans* requires a new generic name. De Vis rightly regarded this fragment as having paramount affinities with *Hypsiprymnodon*[17], and it seems appropriate to utilise Owen's name *Pleopus* (given a year later than Ramsay's),[18] with a prefix denoting antiquity, for this fossil. The affinities exhibited by the dental characters are so definite that they may have been associated with similar

[15] Lydekker, R. Catal. Foss. Mamm. V., 1887, p. 152.

[16] De Vis, C. W., Proc. Linn. Soc. N.S.W., III. (2), 1888, pp. 5-8.

[17] Ramsay, E. P., Proc. Linn. Soc. N.S.W., I., 1876, p. 4.

[18] Owen, R., Ann. Mag. N.H. XX. (4), 1877, p. 542.

pedal structures, but this assumption cannot be verified. As De Vis in his original description used the term Pleopodidæ to embrace what he considered to be the more generalised *Triclis* and the specialised *Hypsiprymnodon*, the new name, *Propleopus*, may be deemed applicable on these grounds.

MARMOR QUARRY FOSSILS.

Through the interest and enthusiasm of Mr. Samuel Evans, J.P., of the Limestone Quarry at Marmor, on the North Coast line, 24 miles south of Rockhampton, several consignments of fossil bones have been received during the last few years.

Unfortunately most of the specimens are very fragmentary, so much so that it is deemed inadvisable, on the present material, to give specific names to several. The list is as follows :—

Thylacoleo carnifex Owen.—Incomplete lower carnassial from the right-hand side; the cutting edge is but little worn; also a calcaneum. It is interesting to be able to add another locality for this remarkable marsupial, which was received through Mr. L. C. Ball.

Trichosurus sp.—Incomplete left mandible. With the exception of the third true molar the crowns of the teeth are missing. Closely comparable with large specimens of the existing *T. vulpecula*.

Diprotodon australis Owen.—Incomplete molar tooth and remains of a vertebra.

Phascolomys sp.—Abraded teeth, including one complete molar, evidently representing a large species, closely comparable with *P. mitchelli*.

Macropus sp.—Remains of molar series which are probably identical with *M. ualabatus*.

Macropus anak Owen.—Fragments of molars of this large extinct kangaroo, which is commonly represented in our Darling Downs material.

Megalania prisca Owen[19].—A single vertebra, somewhat abraded, presents evidence of this gigantic lizard. The presence of facets for chevron bones shows that it belonged to the caudal series. The maximum antero-posterior diameter of the specimen is 37·5 mm., and the diameters of the cup are 18 and 11 mm. The small dimensions suggest a unit from the posterior portion of the tail.

Baron G. J. de Fejérváry[20] has emphasised what he considers a special development of the zygantrum and zygosphene in the Megalanian vertebræ as compared with *Varanus* in his interesting review of the group, and he has established the family Megalanidæ. Lydekker[21] compared the vertebræ of *Megalania* with those of *Varanus sivalensis*, stating that they agree in general

[19] Owen, R., Phil. Trans. Roy. Soc., Vol. 149, 1860, pp. 43-48.

[20] Fejérváry, Baron G. J. de., Ann. Mus. Nat. Hungarici, XVI., 1918, pp. 341-467.

[21] Lydekker, R., Catal. Foss. Rept. Amph. B.M., 1888, Pt. 1, p. 284.

character. There is considerable variation in size and characteristics associated with the vertebræ of present-day species of *Varanus*, and it seems doubtful whether *Megalania prisca* is entitled to special distinction on these grounds from the Monitors.

In the opinion of the writer it is quite incorrect to interpret the vertebræ of *Megalania prisca* as possessing "a strongly developed zygosphen and zygantrum." When a comparison is made between the Megalanian vertebræ and those of reptiles in which the complex articulation of a zygosphene and zygantrum is present in addition to the lateral and more normal facets, such as in *Iguana* or in *Python*, it is obvious that Baron Fejérváry is mistaken in his nomenclature. In *Megalania* the central portion of the neural arch carrying the postzygapophyses is not recessed as a zygantrum, and the supposed zygosphene of Baron Fejérváry is not present between the prezygapophyses. The normal concavities on either side of the median line on the posterior aspect of the neural arch should not be interpreted as a zygantrum. The supposed zygosphene of Baron Fejérváry is merely a small and irregular area above the neural canal on the anterior side and which, in some specimens, may have small lateral tubercles, as recorded by Owen (1881, p. 1038)[22], but which is mainly composed of the anterior ridge of the neural spine. This area varies considerably in its development in different vertebræ, but is never very prominent, and in some specimens is entirely lacking. (Parenthetically, it may be noted that the anterior ridge of the neural spine may be strongly developed in vertebræ of Australian species of *Varanus* to-day.) When two Megalanian vertebræ are closely approximated, it will be seen that these small and variable structures could not have functioned as articulating facets. To refer to them as "a strongly developed zygosphen and zygantrum" is contradictory. It is correct to interpret the articular facets of *Megalania* as strongly developed pre- and post- zygapophyses, and in this respect they differ only in size from the vertebræ of present-day Australian species of *Varanus*.

In 1890 De Vis[23] tentatively expressed the opinion that *Megalania prisca* and *Notiosaurus dentatus* were identical, and this was also stated on our labelled specimens. This contention was subsequently confirmed by R. Etheridge[24].

Included among the other specimens forwarded by Mr. Evans were the mandible of a rat, with molars larger than those of *Rattus norvegicus*, and the humerus of a bat which is identical with that of *Megaderma gigas*.

It is almost certain that the specimens forwarded by Mr. Evans represent distinct periods of deposition.

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[22] Owen, R., Phil. Trans. Roy. Soc., Vol. 171, 1881, p. 1038.

[23] De Vis, C. W., Proc. Roy. Soc. Qld., II., 1885, p. 25, and VI., 1890, p. 97.

[24] Etheridge, R., Proc. Roy. Soc. Viet., XXIX, (2), 1917, p. 127.

NOTE BY Mr. L. C. BALL.

Mr. L. C. Ball, Government Geologist, has kindly given me the following notes on the Marmor Limestone Quarry:—"The Mount Morgan Company's quarries have been excavated in a high bluff of Devonian limestone overlooking the township of Marmor, on the North Coast Railway. Some idea of the size of the quarries may be gained from the knowledge that for long periods the shipments amounted to 2,700 tons per week. The rock as a whole is remarkably free from caverns, and it is believed that the bone earth collected by Mr. Evans came from a joint opening and not from a solution cave. I have not yet had an opportunity to investigate the occurrence."

Mr. Ball describes the matrix as an indurated, bone-bearing cave-earth, which is essentially carbonate of lime, with a brownish stain due to the presence of hydroxides of iron.

REPTILIAN REMAINS FROM TARA CREEK.

The Queensland Museum is indebted to Sir Matthew Nathan, Governor of Queensland, for numerous specimens, and in September last the writer received from him a parcel of fossil fragments which had been collected by Mr. J. R. Chisholm from the head of Tara Creek, a tributary of the Clarke River, by Maryvale Creek, North Queensland, over one hundred miles inland from Townsville. The fragments represent *Chelodina insculpta* De Vis (1897), and a new species of crocodile, which has been named *Crocodilus Nathani* in honour of the donor. These specimens are evidently from alluvial deposits, as shown by adhering grit.

CROCODILUS NATHANI new species.

(Plate III., figures 1 and 2.)

The specific distinction of the Tara Creek crocodile is mainly demonstrated by the proportions of the mandibular symphysis, which extends barely parallel to the posterior border of the fourth tooth. This characteristic readily distinguishes it from the present-day Australian crocodiles, *C. johnstoni* Krefft and *C. porosus*, and from the fossil *Pallimnarchus pollens* De Vis.

The remains consist of three fragments of dentaries, representing two, or possibly three, individuals, several imperfect teeth, and the greater part of a frontal, with portions of a post-frontal, parietal, and of alisphenoids.

An anterior fragment of a left dentary, with part of the symphysis, contains the alveoli of six teeth, from the third to the eighth, the last being incomplete owing to fracture. The fourth, or enlarged tooth, is nearly twice the diameter of the adjoining cavities. The width of this ramus at the symphysis is 55 mm.; the height to the summit of the fourth alveolus is 57 mm., and the total length of the specimen is 110 mm. Reg. No. *F. 1512.* Plate III., fig. 1.

A second fragment also represents the anterior part of a left dentary, with portion of the symphysis, but this is obviously from a younger specimen, although the general characteristics are the same. It contains the alveoli of six teeth, ranging from the third to the eighth. Reg. No. *F. 1513.* Plate III., fig. 2.

Fortunately the posterior contours of the symphysis are preserved in both these specimens, and the writer is thus able to record a striking distinction between these remains and those of the two present-day Australian species (*Crocodilus porosus* and *C. johnstoni*), as well as the fossil species *Pallimnarchus pollens* De Vis.[25] In these Tara Creek specimens the symphysis is relatively shorter and extends barely to the posterior border of the fourth or enlarged "canine" tooth.

In *C. johnstoni* the symphysis ends parallel with the posterior edge of the sixth tooth, in *C. porosus* it extends to the posterior edge of the fifth tooth, and in the relatively far wider *P. pollens* it also ceases opposite the same tooth. Compared with De Vis' species, *C. Nathani* is much narrower in the symphyseal region; the width of the juvenile mandibular type of *P. pollens* from the symphyseal line to the alveolus of the fourth tooth is almost as great as in the less mature of the two dentaries from Tara Creek, although the teeth of the latter are nearly twice the size and the body of the dentary is far more robust.

A third fragment is from the central portion of a left dentary, and, although the broken contours do not permit actual juxtaposition, it was probably continuous in life with *F. 1512.* It contains the alveoli of seven teeth, two being enlarged and corresponding to the usual giant teeth near the posterior third of the series. Should this have been associated with the large anterior fragment, and it would be a remarkable coincidence if it were not so, it is evident that this inland reptile had six teeth, instead of the usual five, between the enlarged units of the mandibular series.

These three fragments bear a general resemblance to *C. porosus* in the sculpturing of the dentary, the presence of numerous pits and openings connected with the dental canal, and in the position of the tooth series.

Among the several specimens of teeth forwarded, no one is quite complete. The largest tooth has a maximum diameter of 25 mm., whilst the crown is 40 mm. in length. The teeth are slightly compressed laterally, and there are prominent anterior and posterior carinæ. The crowns are marked with numerous fine striations.

The actual extent of the splenial cannot be definitely stated, but, judging from the exposed facets, it terminated anteriorly near to the sixth tooth of the dentary, as in *C. porosus.*

The only cranial element consists of the greater portion of the frontal bone, although the anterior tongue is missing, with portions of the parietal,

[25] De Vis, Proc. Roy. Soc. Qld., II., 1886, pp. 181-191.

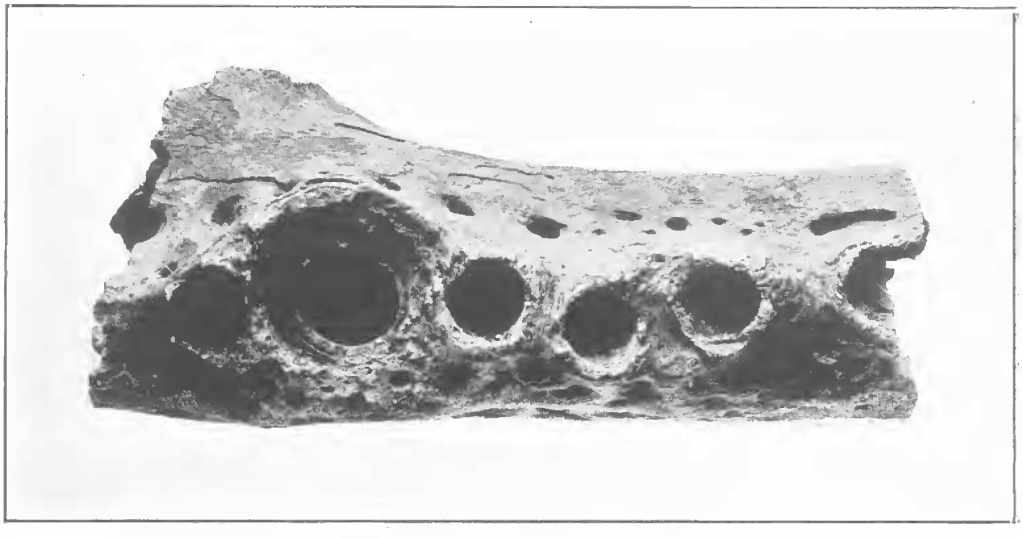

Fig. 1.—*Crocodilus Nathani* Longman. Fragment of anterior portion of left dentary. F. 1512.

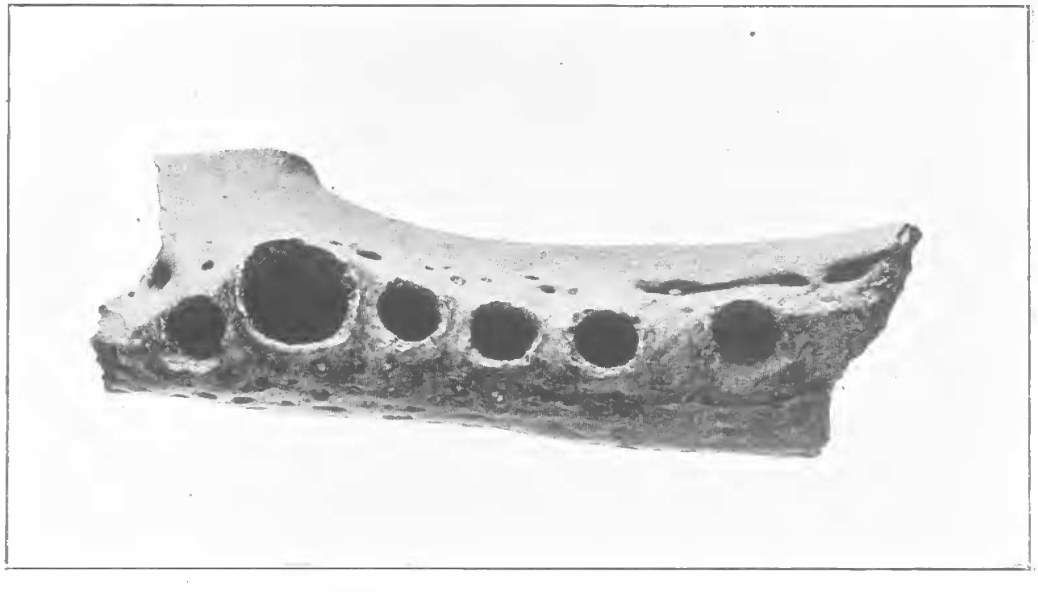

Fig. 2.—*Crocodilus Nathani* Longman. Fragment of anterior portion of left dentary. F. 1513.

Face page 24.

the alisphenoids and the left post-frontal. The fronto-parietal suture does not reach the supratemporal fossa, owing to the backward extension of the post-frontal, this characteristic being noted by C. C. Mook as a distinguishing feature of *Crocodilus* in comparison with *Osteoblepharon*.[26] The superior contours of the orbits and of the supra-temporal fossa do not appear to have been very different from those of *C. porosus*, judging from the preserved portions. The external sculpturing and the size of the fossil fragments agree fairly well with the dimensions of corresponding elements on the upper part of a skull of *C. porosus*, which is 610 mm. in length. There are striking differences, however, in the comparative thickness, the frontal being little more than half the depth of the living reptile, although covering the same area superiorly. On the internal surface of the frontal the rhinencephalic groove, or sulcus olfactorius, is not so deep as in the living reptile. The contours of the alisphenoid in its connecting pier with the post-frontal are also very distinct from *C. porosus*. These distinctions are very apparent when direct comparison is made, but are somewhat difficult to put into words. They serve to emphasise the definite difference existing between the mandibles. The unusual thickness of the skull bones of *C. porosus* is noted by Mook in his valuable studies of crocodilian osteology. Reg. No. *F. 1514*; probably from the same individual as *F. 1512*.

A fragment of a large dentary from Floraville Crossing, Leichhardt River, previously referred by De Vis to *P. pollens*,[27] evidently belongs to *C. Nathani*. The symphyseal region is too narrow for De Vis' species, and the union terminates parallel with the posterior margin of the fourth tooth.

Affinities.—In the absence of comparative material from other parts of the world, it is impossible to deal adequately with the affinities of this inland Queensland species, as it is at present represented. Judging from the symphysis *C. Nathani* has some likeness to *C. palustris* and to *C. sivalensis*, the probable ancestor of the Indian crocodile (Lydekker).[28] There are, however, general resemblances to *C. porosus*, and it seems more probable that this Tara Creek crocodile was a somewhat specialised inland species, derived from the ancestors of *C. porosus*. Such reptiles found a congenial environment in the last geological period, when the inland rainfall was probably far greater. It is evident from palæontological data that species of crocodiles were far more numerous in the past in various parts of the world, and in this connection the ecological studies of these reptiles published by K. P. Schmidt[29] are of interest.

It should be noted that fossil remains of *C. porosus* were recorded by Lydekker (*loc. cit.*, p. 59) from the Darling Downs. In the spelling of *Crocodilus* the writer has maintained the common usage in preference to *Crocodylus*.

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[26] Mook, C. C., Bull. Amer. Museum Nat. Hist., XLIV., 1921.

[27] De Vis. Ann. Qld. Mus., No. 7, 1907, p. 6.

[28] Lydekker, R., Catal. Foss. Rept. Amph., Pt. 1, 1888, p. 55.

[29] Schmidt, K. P., Bull. Amer. Mus. Nat. Hist., Vol. XXXIX., 1919.

CHELODINA INSCULPTA De Vis.[30]

This species is at once recognisable by the great thickness of its carapace and plastron (attaining 19 mm. in places) in comparison with present-day species, as well as by the strongly marked though variable sculpturing. The largest fragment consists of the anterior moiety of the plastron, much abraded, with remains of both bridges. Another fragment is part of the right hypoplastral and xiphiplastral bones, the contours of which demonstrate that this species had a pronounced ventral curve on the extreme lateral borders of the posterior part of the plastron.

The carapace is represented by several small fragments, including remains of two posterior neurals with part of the last costal plate, the base of the left ilium being attached. An isolated right ilium, with the iliac section of the acetabuluni, is fairly complete and shows that the dimensions of the pelvic elements did not exceed those of large specimens of *Chelodina expansa*, notwithstanding the thickness of the shell. This species has been previously recorded from Eight-mile Plains (near Brisbane), Darling Downs, and the Warburton River.

A NEW GIGANTIC MARINE REPTILE FROM THE QUEENSLAND CRETACEOUS.

KRONOSAURUS QUEENSLANDICUS new genus and species.

(Plate IV.)

A fragment of a very massive sauropterygian mandible, forwarded from Hughenden by Mr. A Crombie, in 1899, demonstrates the existence in Australia in Cretaceous times of a reptile far larger than any yet put on local record. Although tantalisingly incomplete, this fragment presents such definite characters that it is desirable to describe it, so far as the evidence permits, and to give it a distinctive name.

The fossil is a portion of the anterior end of a mandible, and is 200 mm. in maximum length, 120 mm. in height, with a breadth of at least 140 mm., when allowance is made for abrasion.

Teeth.—There are remains of six very large thecodont teeth, three on each side of the symphyseal portion of a massive yet relatively narrow rostrum. Two of these teeth and the alveolus of a third are represented on Plate IV., where the external surface of the mandible is abraded. These teeth have a pronounced slope antero-posteriorly, and it is also evident that the right and left series of alveoli are set obliquely, resulting in a slight divergence of the apices of each tooth from the median line. The preserved portions of the teeth are mainly alveolar and the crowns are missing. From the remains of an unerupted or germ tooth, embedded in the fossil adjoining one of the larger teeth, it appears that the crowns were conical. There is no evidence of either

[30] De Vis, C. W., Ann. Qld. Mus. No. 3, 1897, p. 5.

KRONOSAURUS QUEENSLANDICUS Longman.

Fragment of mandibular symphysis, with remains of three teeth and alveoli.
Maximum length 200 mm.

Face page 26.

carinæ or flutings in the portions preserved. The immense sockets are distinctly separated, and may reach within 21 mm. of the lower margin of the mandible, but as this has been abraded the bulk of bone here may have been thicker. The teeth have a maximum diameter of 40 mm. in the upper part of the alveolar portion, and this decreases to about 30 mm. at the base. The contours are circular in horizontal sections throughout, and the slight tapering ends abruptly, as in the tooth of *Peloneustes philarchus*[31]. The maximum length of the preserved section of teeth is 140 mm., and this suggests a total length of at least 250 mm., being comparable with that of *Pliosaurus grandis*. The centre line of each tooth is situated about 65 mm. from that of its neighbour. With the exception of a circular sheath, the walls of which are 6 mm. in thickness, the preserved portions of the teeth (dentine and pulp cavity) are entirely changed into a crystalline formation identified as barytes (*see* Note[32]). Between the white enamel-like circular sheath and the walls of the alveolus there is evidence of a thin surrounding film of matrix, which suggests that the teeth were never firmly anchylosed.

Mandible.—The condition of the mandible does not lend itself to detailed description, but it is evident that it represents a type with a pronounced rostrum, and a lengthy symphysis. On the lower surface in the median line a thin vein of matrix marks the juxtaposition of the right and left hand elements. Certain structures, which are more apparent at the anterior end, were at first thought to be splenial elements, but later study makes it more probable that these are remains of a large oval dental canal, on each side, now infilled with fine matrix, connected with the pulp cavities. The mandible in the region preserved is thought to be wholly composed of the two conjoined dentaries. On the superior surface in the median line there was a prominent ridge running above and between the alveolar borders. In his description of the mandible of *Pliosaurus grandis* Owen[33] referred (p. 5) to a median longitudinal rising formed by the interalveolar part of the "symphysis mandibulæ." The right side of the mandible, as illustrated in Plate IV., is abraded to the median line of the tooth row, but on the left side the bases of the alveoli are not exposed. In section the lower moiety of the dentaries is semi-circular, and brings to mind the contours of *Ichthyosaurus*.

It is almost certain that the three teeth preserved on each side do not represent the maximum for the symphyseal region. The right and left series of teeth are parallel, and the preserved contours suggest that in this region the lateral surfaces of the dentaries were also parallel. *Kronosaurus* evidently possessed a very lengthy and powerful mandible, with probably no great width in the posterior portion.

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[31] Lydekker, R., Catal. Foss. Rept. Amph., II., 1889.

[32] I am indebted to Professor H. C. Richards for the identification of this material as barytes—"composition $BaSO_4$ (Barium sulphate). The barytes is very pure and very well crystalised."

[33] Owen, R., Mon. Brit. Foss. Rept., Kimmeridge Clay, III., 1869.

When first received, this fossil was tentatively labelled by the late C. W. De Vis as an *Ichthyosaurus*, but when studying the large skull of *Ichthyosaurus australis*[34] the writer found that it could not be placed in that family owing to the large socketed teeth and the general structure of the mandible.

Affinities.—In dealing with the difficulty of allocating fragmentary remains of plesiosaurs, S. W. Williston[35] referred to the provisional character of generic names. Owen and Leidy based genera on a single tooth, whilst vertebræ have been frequently used. This Queensland fossil cannot be satisfactorily placed in any genus known to the writer, although it presents some of the characteristics of *Pliosaurus* and allied genera described and illustrated by C. W. Andrews in his fine monographs on the Marine Reptiles of the Oxford Clay.[36] The contours of the teeth and mandible, however, seem to be quite distinct, and the resemblances may be due to homoplasy. Because of its lengthy symphysis it cannot be placed in *Cimoliasaurus*, a genus which, in Williston's words, "has served as a sort of waste-paper basket for the reception of fragments and poorly known forms." For the same reason it is excluded from the Plesiosauridæ as a sub-order. The teeth are by no means so divergent laterally as in Andrews' *Simolestes*, and they are larger, straighter, and not so tapering in the alveolar region as in *Peloneustes evansi*. In the circumstances it seemed necessary to give this gigantic marine reptile from the Australian Cretaceous generic and specific names, and it is firmly believed that when other remains are forthcoming of *Kronosaurus queenslandicus* that this course will be found fully justified. The lengthy symphysis, massive mandible, and very large teeth set in separate sockets, are outstanding features that suggest affinities, however, and the fossil is placed provisionally in the sub-order Pliosauridæ of the Plesiosauria, the latter term being used in preference to Sauropterygia in view of Boulenger's remarks in 1917.[37] Andrews records this sub-order as ranging from the "Lower Jurassic to the Upper Cretaceous of Europe." (1913, p. 1).

Matrix.—This is similar to that associated with other vertebrate remains from the Hughenden district such as *Ichthyosaurus* and *Cratochelone*, described by the writer, being a fine-grained calcareous mudstone.

Other Queensland Cretaceous reptiles include *Plesiosaurus macrospondylus* McCoy and *P. sutherlandi* McCoy,[38] regarded by Etheridge as *Cimoliasaurus*,[39] which were described from vertebræ, the dimensions of which do not suggest so large a reptile as *Kronosaurus*. *Cimoliasaurus leucoscopelus* and *C. maccoyi*, described by Etheridge (1897 and 1904)[40] from interesting remains found at White Cliffs, New South Wales, which had been converted into opal, may be also excluded for the same reason.

[34] Longman, H. A., Mem. Qld. Mus., VII., 1922, pp. 246-256.
[35] Williston, S. W., Field Columbian Mus., Geol. Sur., 1903, II.
[36] Andrews, C. W., Catal. Mar. Rept. Oxford Clay, pts. 1 and 2, 1910-1913.
[37] Boulenger, P.Z.S., 1917, p. 221.
[38] McCoy, F., Ann. Mag. N. H., XIX., 1867, p. 356.
[39] Etheridge, R., Rec. Aus. Mus., III., 1897, p. 19.
[40] Etheridge, R., Rec. Aus. Mus., V., 1904, p. 306-316.